

## **The Atmospheric Model Evaluation Tool**

**Authors:** Robert Gilliam, Wyatt Appel

U.S. EPA/Office of Research and Development (ORD)/National Exposure Research Laboratory (NERL)/Atmospheric Modeling Division in partnership with National Oceanic and Atmospheric Administration (NOAA)

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Air quality and atmospheric modeling has expanded in complexity and application during the past few decades. Meteorological and air quality models, such as the Mesoscale Model version 5 (MM5), the National Centers for Environmental Prediction (NCEP) Eta model, and the Community Multiscale Air Quality (CMAQ) model, are being developed, in part, for air quality applications, air quality forecasting, assessing climate impacts on air quality, and developing emission control strategies. The US EPA and National Oceanic and Atmospheric Administration (NOAA) are taking a lead role in this modeling evolution.

Results from air quality model applications are closely linked to the meteorological model that drives the diffusion/dispersion, deposition, chemical transport, and chemical reactions. Because of the underlying linkages, modeling systems should be evaluated by considering all components/models involved. To address this need and support our general modeling efforts, an interactive model evaluation toolkit for air quality and meteorological models is being developed as part of a broader Atmospheric Model Evaluation Tool (AMET). A few of the benefits of AMET are that model error and uncertainty are better assessed, the evaluation process is made more efficient and less labor intensive, a large volume of evaluation results can be easily managed, and a direct linkage between the meteorological and air quality model evaluation is made possible. Furthermore, these benefits will ultimately augment the model development process.

The AMET matches observational data with the corresponding model-estimated values in space and time and then stores the paired observation and model values in a relational database. Subsequent analysis programs extract user-specified data from the database to generate statistical plots and tables. The database-driven framework allows users to isolate data by state, region, latitude, longitude, elevation, land use, observation network, date, time of day, pollutant concentration or meteorological conditions, or any combination of these criteria. Thus far, the AMET has been beneficial in several formal evaluations of the CMAQ modeling system as documented in peer-reviewed journal articles. Improvements and enhancements are planned for the AMET.

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**Point of Contact:**

Robert Gilliam

Meteorologist

NOAA/U.S. EPA

MD: E243-03

4930 Page Road

Research Triangle Park, NC 27703

919-541-4593

[gilliam.robert@epa.gov](mailto:gilliam.robert@epa.gov)